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| 10/520,337 | 03/28/2005 | Claus Thybo | 6495-0090WOUS | 2586 |
| 7590 04/04/2008 McCorminck Paulding & Huber CityPlace II 185 Asylum Street Hartford, CT 06103-4102 | | | EXAMINER | |
| | | | KOCA, HUSEYIN | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|-------------------------------------|
| Office Action Summary | Application No. 10/520,337 | Applicant(s) THYBO ET AL. |
| | Examiner HUSEYIN KOCA | Art Unit 3744 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 04 January 2008.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-17 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 02/20/08

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____

5) Notice of Informal Patent Application

6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In order for a method to be statutory it must show a practical application of an otherwise abstract idea. In order to meet this requirement it must (a) show a practical application through a physical transformation or (b) otherwise produce a useful, concrete and tangible result. A physical transformation can be shown if the method transforms an article or physical object into a different state or thing. In the presently claimed invention each of the method steps is intended to be performed in a computer, the human mind, or with the aid of a pencil and paper. There is no physical object which can be or is transformed. Further, the presently claimed invention fails to produce a concrete result. Claim 1 includes the limitation "determining a first rate of heat flow of a heat exchange fluid flow across a heat exchanger of the system and a second rated of heat flow of the refrigerant across the heat exchanger; and using the rates of heat flow for establishing an energy balance from which a parameter for monitoring the refrigerant flow is derived." Claim invention does not produce a tangible result as the mere calculation of a parameter for monitoring the refrigerant is a functional limitation language which has no impact on the system. Claims 2-11 incorporate these deficiencies through their dependencies and fail to correct the deficiency, and as such are rejected for the same reason.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoecker (Industrial Refrigeration Handbook), and further in view of Cengel (Thermodynamics).

In regard to claims 1 and 4-7, Stoecker teaches detecting a flash gas in vapor-compression refrigeration comprising a compressor, a condenser, and expansion device, and an evaporator interconnected by conduits providing a flow path for a refrigerant (Pages 64-68). Stoecker teaches using thermodynamics characteristics of a heat exchanger (see Example 3.1 in pages 66-68) but does not teach the details of establishing an energy balance. Cengel teaches determining a rate of heat flow of a

heat exchange fluid across a heat exchanger and forming an energy balance in detail (Pages 193-195). It would have been obvious to one having ordinary skill in the art at the time the invention was made to detect flash gas using thermodynamics properties of the refrigerant since it has direct relation with cause of flash gas. Establishing an energy balance is a well-known method and it is the 1st Law of Thermodynamics. Additionally, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine the mass flow and the specific enthalpy because they are obvious mechanical expedient and one ordinary skilled artisan would normally calculate these parameters for the purpose of studying or varying the flow characteristics.

In regard to claims 2 and 3, Cengel teaches determining rate of heat across a heat exchanger (Pages 193-195). Since the evaporator and the condenser are both heat exchangers it would have been obvious to one having ordinary skill in the art at the time the invention was made to determined rate of heat flow of heat exchange fluid flow across a heat exchanger (which might be evaporator or a condenser) in order to establish an energy balance equation.

In regard to claim 8, Stoecker teaches that the flash gas develops as the expansion proceeds (Page 65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to establish the refrigerant mass flow based on a flow characteristics of the expansion device, the expansion device opening passage and/or opening period, and an absolute pressure before and after the expansion device in order to detect and remove flash gas from the system.

In regard to claim 9, see the rejection for claims 1 and 8 above.

5. Claims 10 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoecker (Industrial Refrigeration Handbook) in view of Cengel (Thermodynamics) as applied to claim 1 above, and further in view of Seem (6,223,544).

In regard to claim 10,12, and 16, Stoecker in view of Cengel teach most of the limitations of the claim but do not explicitly teach establishing a residual and generating a signal. Seem teaches establishing a residual based on energy balance and indicating a problem with the system (C-6, L-25-67; C-7, L-1-20; Fig. 3). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to establish a residual as taught by Seem in the system of Stoecker in view of Cengel in order to advantageously determine the problems in the system.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stoecker (Industrial Refrigeration Handbook) in view of Cengel (Thermodynamics) and Seem (6,223,544) as applied to claim 10 above, and further in view of Parlos et al. (6,590,362).

In regard to claim 11, Stoecker, Cengel, and Seem teaches most of the limitations of the claim but do not explicitly teach a fault indicator equation. However, obtaining fault indicator equation for different apparatuses is within the skill and knowledge of one having ordinary skill in the art. An example of this can be seen by Parlos et al. where Parlos et al. teach a fault indicator equation for detecting the mechanical faults (C-7, L-1-8). Therefore, it would have been obvious to one having

Art Unit: 3744

ordinary skill in the art at the time the invention was made to obtain a fault indicator equation in order to determine the faults with the system.

In regard to claims 13-15, see the rejection for claims 1 and 4-7.

In regard to claim 17, Stoecker in view of Cengel teach most of the limitations of the claim but do not explicitly teach comparing output signal with a previously stored output signal. Seem teaches comparing output signal with a previously stored output signal (C-1, L-60-67; C-2, L-55-61). It would have been obvious to one having ordinary skill in the art at the time the invention was made to compare output signal with a previously stored output signal as taught by Seem in order to advantageously determine the operation condition of the system.

Remarks

7. Examiner has cited particular paragraphs, figures, columns and line numbers in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Response to Arguments

8. Applicant's arguments filed 01/04/2008 have been fully considered but they are not persuasive.

1. Applicant traverses the 35 U.S.C. 101 rejection regarding to claims 1-11.

In response, in order for a method (process) to be statutory it must show a practical application of an otherwise abstract data. In order to meet this requirement it must (a) show a practical application through a physical transformation or (b) other produce a useful, concrete and tangible result. Claim 1 cites determining a first rate of heat flow, a second rate of heat flow, and using the rates of heat flow for establishing energy balance; which does not provide a physical transformation or produce tangible result. Each of the methods steps claimed in claim 1 is intended to be performed in a computer, the human mind, or with the air of a pencil and paper. More specifically, determining a rate of heat flow can be done through calculations using equations known in the art by a computer, and/or pencil and paper. Applicant's argument is not persuasive. Therefore the rejection is proper and remains.

2. Applicant argues that Stocker in view of Cengel fail to teach the claim 1 limitations. Particularly, Stocker fails to teach or suggest determining a first rate of heat flow of a heat exchange fluid flow across a heat exchanger of the system and a second rate of a heat flow of the refrigerant across the heat exchanger; and also fails to teach or suggest establishing an energy balance across a heat

exchanger from which a parameter for monitoring the refrigerant flow is derived.

Cengel fails to teach or suggest establishing an energy balance from which a parameter for monitoring the refrigerant flow is derived; and also fails to teach or suggest anything regarding flash gas in a refrigeration plant.

In response, Applicant merely recites the claim limitations and states that the references do not teach these limitations. Applicant is silent to how or why the references do not teach the claim limitations. Additionally, Applicant agrees that the Stocker reference teaches determining the quantity of flash gas in the arguments filed 01/04/2008 in page 9, lines 13-14. Stoecker reference was used for teaching detecting a flash gas in vapor-compression refrigeration comprising a compressor, a condenser, and expansion device, and an evaporator interconnected by conduits providing a flow path for a refrigerant which is what is cited in claim 1 limitation. Additionally, Stocker does teach determining a rate of flow across a heat exchanger (evaporator) (page 67). Cengel reference was used to clearly show the teaching of determining a rate of flow across a heat exchanger and establishing an energy balance equation from it. Therefore, Applicant's arguments are not persuasive and the rejection is proper and remains.

3. Applicant argues that Seem does not teach establishing a residual as a difference between two rates of heat flow regarding to claim 10.

In response, Applicant again merely recites the claim limitation and states that the reference do not teach this limitation. Additionally, Applicant agrees that Seem teaches establishing a residual and indicating a problem with the system in the arguments filed 01/04/2008 in page 10, lines 21-22. Seem does teach establishing a residual as a difference between two rates of heat flow (Eq. 4; Eq. 7; Eq. 11; Eq. 12). It is respectfully requested from the applicant to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. Therefore, the rejection is proper and remains.

4. Applicant argues that Stocker and Cengel, individually, nor the combination thereof, also does not teach or suggest means for evaluating the refrigerant mass flow regarding to claim 12.

In response, Seem reference was used to teach the general concept of evaluation and indication of a problem with the system. Additionally, Applicant agrees that Seem teaches indicating a problem with the system in the arguments filed 01/04/2008 in page 10, lines 21-22. The prior art references, Stocker, Cengel, and Seem, create a *prima facie* case of obviousness to one of ordinary skill in the art at the time of the invention. Therefore, the rejection is proper and remains.

5. Applicant argues that Seem fails to teach or suggest using the air temperatures to determine refrigerant properties; and directly measuring any property of the refrigerant regarding to claim 12.

In response, the features upon which applicant relies (i.e., using the air temperatures to determine refrigerant properties; and directly measuring any property of the refrigerant) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Therefore, the rejection is proper and remains.

6. Applicant argues that Parlos fails to teach or suggest at least establishing a residual as a difference between two rates of heat flow establishing an energy balance across a heat exchanger for detecting flash gas regarding to claim 11. In response, Parlos was used for teaching the general concept of providing a fault indicator which falls within the realm of common knowledge as obvious mechanical expedient. Establishing a residual as a difference between two rates of heat flow was taught by Seem reference (see Argument 3 above). Applicant's argument is not persuasive. The rejection is proper and remains.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huseyin Koca whose telephone number is (571) 272-3048. The examiner can normally be reached on Monday - Friday 9:00AM to 4:00PM.

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834 or Frantz Jules (571) 272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

Art Unit: 3744

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HK/

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744